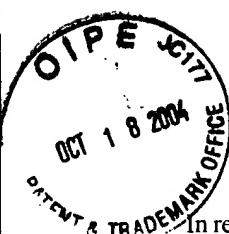


IFW AV/ 3682



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Docket No: Q63051

Toru TSUKADA, et al.

Appln. No.: 09/809,262

Group Art Unit: 3682

Confirmation No.: 6379

Examiner: Chong Hwa KIM

Filed: March 16, 2001

For: FEED SCREW DEVICE

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

P.O. Box 1450


Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. The USPTO is directed and authorized to charge the statutory fee of \$340.00 and/or all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860


Daniel V. Williams
Registration No. 45,221

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: October 18, 2004



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APPEAL BRIEF UNDER 37 C.F.R. §41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

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Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellants submit an Appeal Brief to appeal from the Office Action dated February 18, 2004, wherein claims 17-23 and 25-27 were finally rejected. This Appeal Brief is accompanied by a Submission which includes the required appeal fee set forth in 37 C.F.R. §41.20(b)(2). Appellants' Notice of Appeal was filed on August 18, 2004. Therefore, the present Appeal Brief is timely filed.

I. REAL PARTY IN INTEREST

The real party of interest is NSK Ltd. (Assignee) by virtue of an assignment executed by the Inventors, in June 1997, and recorded by the Assignment Branch of the U.S. Patent and Trademark Office in parent Application No. 08/877,518 (now U.S. Patent No. 6,338,285) on reel/frame 8615/0838.

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II. RELATED APPEALS AND INTERFERENCES

Upon information and belief, there are no other prior or pending appeals, interferences, or judicial proceedings known to Appellants, Appellants' representative or the Assignee that may be related to, be directly by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-16 and 24 are canceled. Claims 17-23 and 25-27 are rejected (*see* final Office Action dated February 18, 2004). Claims 17-23 and 25-27 are the claims on appeal (*see* Appendix).

IV. STATUS OF AMENDMENTS

No amendments were made to the pending claims after the issuance of the final Office Action dated February 18, 2004.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

An exemplary embodiment of the present invention is drawn to a feed screw device that provides lubricant to a screw shaft. As shown in a prior feed screw device of Figure 1, a shaft 50 extends through a nut member 51 and is contacted by a sealing member 54 that is made from a plastic containing a lubricant. (page 1, lines 8-24). A lubricant exudes from the sealing member 54 and decreases frictional resistance between an inner peripheral surface of the sealing member 54 and an outer peripheral surface of the screw shaft 50. (page 2, lines 20-24). Prior feed screw devices have suffered from configurations that are large in size (page 3, lines 8-9); do not

provide sufficient lubrication (page 3, 15-21); and which result in displacement of parts and premature wear (page 3, line 22-page 4, line 6).

The features disclosed in the present specification provide a novel and unobvious configuration that addresses problems in the prior art. Independent claim 17 will be described in regard to the embodiment of Figures 19 and 20, which were elected in response to the Election/Restriction requirement dated July 30, 2001. However, it is noted that certain features of Figures 19 and 20 are shared with other embodiments, as noted in the specification, and reference may be made to these other embodiments when describing portions of the invention.

As shown in Figure 3, a feed screw comprises a nut member 2 threadably engaged with a screw shaft 1 having a spiral thread groove 1a on an outer peripheral surface (page 21, lines 18-22). The nut member 2 is formed with a thread groove 2a corresponding to the thread groove 1a of the screw shaft 1 and has a ball circulation passage for guiding and circulating the balls 3 (Figure 4) rolling in both the thread grooves 1a and 2a (page 21, line 22 – page 22, line 2).

Turning to particular features of claim 17, as shown in Figure 19, a lubricant supply device 106 is provided with an insertion hole 107 and comes in contact with an outer surface of the screw shaft 1. At least the portion of the lubricant supply device 6 coming in contact with the screw shaft 1 is made of a material containing a lubricant (page 30, lines 16-19).

A fixed ring or retaining ring 108 is provided to attach the lubricant supply device 106 to the nut member 2 and has a surface facing an end face of the lubricant supply device 106 (page 32, lines 17-20). The retaining ring 108 has a projection 110 extending therefrom that engages

with the lubricant supply device 106 (page 40, lines 19-20). As shown in Figure 19, the retaining ring 108 has a diameter larger than the lubricant supply device 106 and extends radially beyond the lubricant supply device 106.

The projection 110 is received in the insertion hole 107 so that rotation of the lubricant supply device 106 can be prevented (page 35, lines 13-17). As shown in Figure 19, the projection 110 is not formed to extend circumferentially all the way around the screw shaft 1, but instead is a protrusion that is positioned at only a portion of the circumference of the screw shaft 1. During assembly, the lubricant supply device 106 is fitted into a recess 4 so that it is between the screw shaft 1 and the nut member 2 (page 33, lines 14-16).

The projection 110 of the retaining ring 108 is inserted into the insertion hole 107 of the lubricant supply device 106 and set screws 111 are inserted into through holes 109 (page 33, lines 22-25.) The screws 111 are thus engaged with the holes 5 such that the retaining ring 108 is abutted against the end face of the nut member 2 and fixed thereto (page 33, line 24-page 34, line 2). The lubricant supply device may also have a cut part in the circumferential direction, which can be seen in Figure 19 (e.g., cut extending from an inner circumference of the lubricant supply device to an outer circumference (page 32, lines 10-11)).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 17, 18, 21-23, 26 and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over 1) Jelinek (U.S. Patent 4,053,167) in view of 2) Yabe et al. (U.S. Patent 6,004,039 [hereinafter “Yabe”]) and in view of 3) Cartwright (U.S. Patent 4,177,997).

B. Claims 19 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Jelinek in view of 1) Yabe, in view of 2) Cartwright and further in view of 3) Spontelli (U.S. Patent 2,818,745).

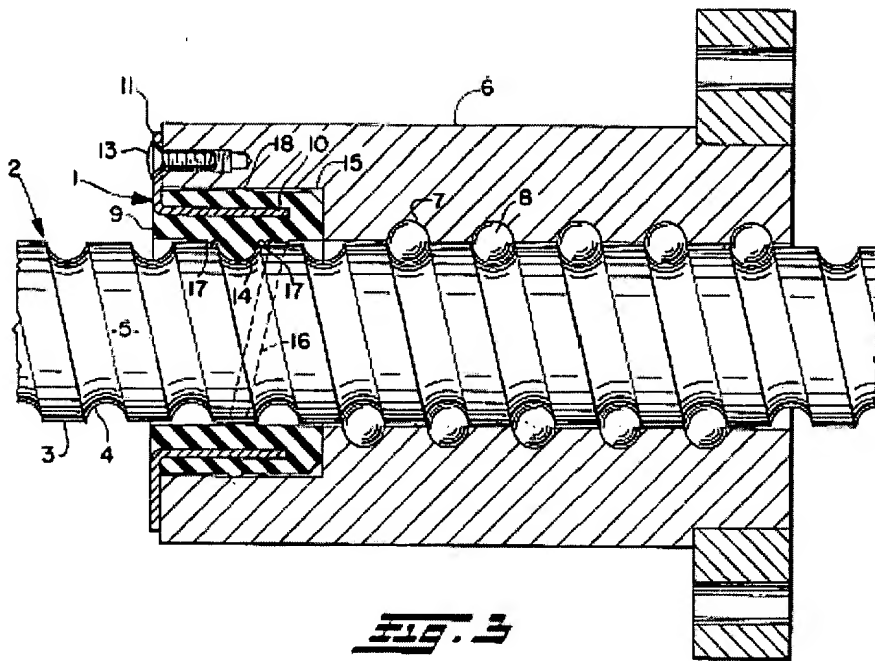
C. Claims 17,18 and 20-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over 1) Nilsson (U.S. Patent 3,532,004) in view of 2) Masutani et al. (U.S. Patent 5,401,574 [hereinafter “Masutani”]) in view of 3) Sugihara et al. (U.S. Patent 5,695,288 [hereinafter Sugihara”]) and in view of 4) Jelinek.

VII. ARGUMENTS

A. ONE WOULD NOT HAVE BEEN MOTIVATED TO MODIFY JELINEK, IN VIEW OF YABE AND CARTWRIGHT TO OBTAIN THE FEATURES OF CLAIMS 17, 18, 21-23, 26 AND 27.

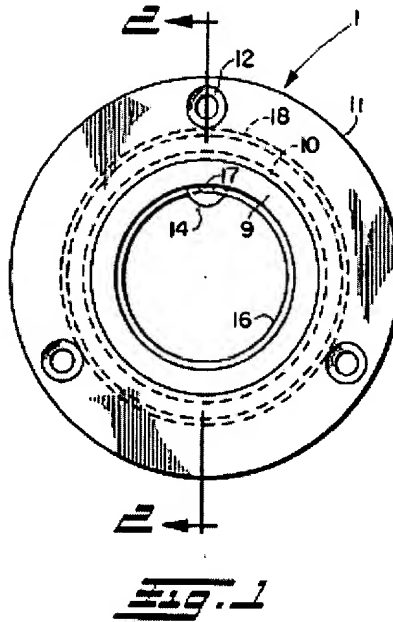
The Examiner applies Jelinek for allegedly disclosing a screw shaft 5, a nut member 6 and a ring 9 (applied against the lubricant supply device), as show below in reproduced Figure 3. A “flange” 11 of Jelinek is applied against the claimed retaining ring. The flange 11 is part of a retainer 10, and the retainer 10 is bonded to the ring 9. (See Jelinek col. 2, lines 1-4). The area

of the retainer 10 that extends into the seal 9 is applied against the claimed projection. The retainer 10 is formed in a tube shape that extends into the ring 9 (see also Figure 1).



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The device of Jelinek is used to provide a seal for high hydraulic pressures of 2500 psi. (See Jelinek col. 2, lines 34-35.) Figure 1 is a front view of the retainer flange 11 (reproduced below) and includes holes 12 to insert mounting screws 13 that coaxially retain the ring 9, retainer 10 and the nut 6. (See Jelinek, col. 2, lines 4-5.) Jelinek also teaches that the retainer may be “off course” completely omitted when the device is used in low pressure installations. (See Jelinek, col. 2, lines 34-37.)



Turning to the invention, independent claim 17 recites that a projection is formed on the retaining ring and *extends circumferentially less than all of the way around said screw shaft*. For example, as shown in Figure 19 of the present specification, the projection 110 engages with the insertion hole 107 at one position and clearly does not extend around the full circumference of the screw shaft 1. The Examiner acknowledges that Jelinek does not disclose this feature. (See Office Action dated February 18, 2004, page 3, lines 15-17.) This is because the retainer 10 is cylindrically shaped and must necessarily extend all the way around the screw 5. Thus, Jelinek teaches only to utilize the cylindrical retainer 10 as shown in Figures 1-3, or to not use the retainer at all, if in a low-pressure environment.

In an attempt to make up for the deficiencies of Jelinek, the Examiner turns to Cartwright that discloses a high pressure floating ring assembly having a sealing surface fit to an outer

diameter of a cylindrical shaft. (See Abstract.) Relative motion is taught to exist between the inside diameter of the floating ring and the outside diameter of the shaft. (*Id.*) The Examiner cites a bearing pin 188 for allegedly teaching a projection and cites to an end closure member 44 for allegedly teaching a retaining ring.

As shown in Figure 1 of Cartwright, reproduced below, the floating ring seal assembly 10 includes a shaft 12, an upstream floating ring seal unit 20 and a downstream floating ring seal unit 22. (See Cartwright, col. 2, lines 25-28). A differential pressure is applied to the assembly 10 in the direction of the arrow 18. (See Cartwright, col. 2, line 20.)

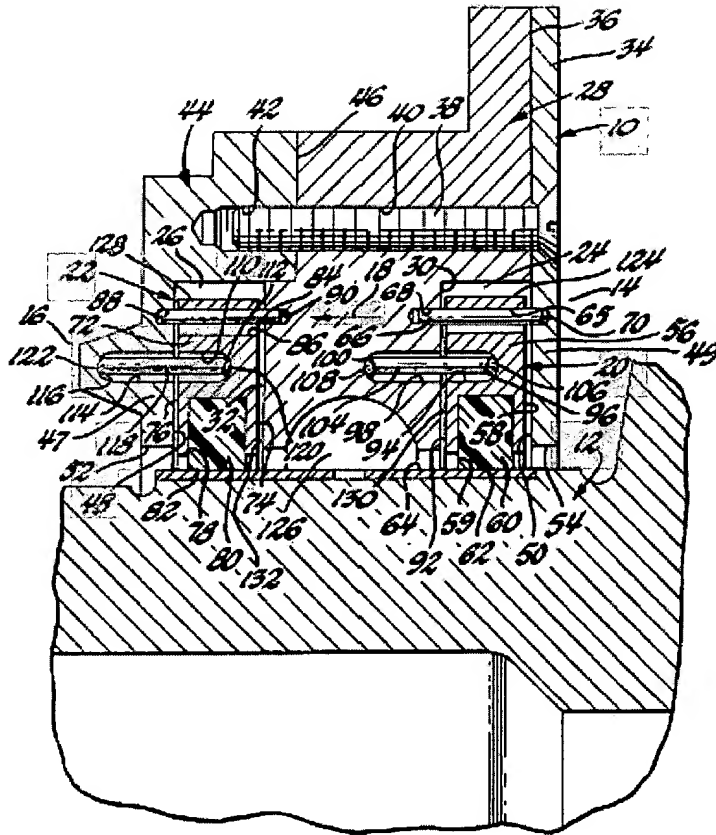


Fig. 1

The downstream ring seal unit 22 includes a plurality of circumferentially spaced cylindrical bores 110 therein. (See Cartwright, col. 3, lines 39-47.) The cylindrical bores 110 each receive a thrust bearing pin 118 having rounded ends 120, 122 to engaged with hemispherical bearing surfaces 112 of the bores 100. (Id.) Thus, the thrust bearing pin 118 essentially acts as a spacer. Cartwright provides this configuration to maintain a minimum gap

relationship between the downstream surface 76 of the carriage ring 72 and the housing surface 48. (See col. 3, lines 17-22.) In effect, Cartwright uses the bearing pins 118 (applied against the claimed projection) as a positioning element between the housing surface 48 and the downstream floating ring seal unit 22 so that the floating unit 22 does not become too close to the housing 48.

The Examiner does not propose to physically substitute the actual thrust bearing pin 118 of Cartwright directly into Jelinek because Jelinek clearly does not have any use for a thrust bearing pin. Instead, the Examiner contends that the thrust bearing pin 118 of Cartwright would have motivated one to modify the retainer 10 of Jelinek so that the retainer 10 does not extend fully around the ring 9. Appellant whole heartily disagrees with the Examiner's position.

The thrust bearing pin 118 of Cartwright and the retainer 10 of Jelinek are utilized in different environments and have different objectives. Upon review of the references, one will see the clear lack of motivation to modify the circular retainer 10 of Jelinek in view of the thrust bearing pin 118 of Cartwright. In particular, if one were to utilize the teachings of Cartwright, they would have been taught that a thrust bearing pin 118 can be used as a spacing element between two parts that are movable relative to each other. These teaching would have not motivated one to modify Jelinek in any manner. First, Jelinek does not include parts that are movable in relation to each other as in Cartwright. Instead, Jelinek provides a seal 9, a retainer 10 and a nut 6 that do not move in relation to each other. Therefore, there is no need to apply the thrust bearing pin 188 of Cartwright to Jelinek.

Second, there is no way to modify the retainer 10 of Jelinek to utilize any features of the thrust bearing pin 118. For example, the bearing pin 118 is disposed in the bore 110 to maintain a positional relationship between the housing surface 48 and the carriage ring 72. Cartwright teaches that its floating ring seal assembly 10 is subjected to differential pressures and accordingly utilizes the upstream and downstream floating seal units 20 and 22. However, the non-floating seal of Jelinek is not subjected to the same differential pressures, nor does Jelinek have a need for upstream and downstream floating seal units. Thus, the teaching of the bearing pin 118 would not have motivated one to modify the retainer 10 of Jelinek in any manner, let alone to modify the retainer 10 so that it extends circumferentially less than all of the way around the screw 3.

Moreover, and regardless of the teaching in Cartwright, one would not have been motivated to remove any portion of Jelinek's retainer 10 so that it extends circumferentially less than all of the way around the screw 3. For example, as noted earlier, Jelinek indicates that the seal is used at "high hydraulic pressures of 2500 psi or more." In view of such pressures, one skilled in the art would appreciate that the retainer 10 extends circumferentially around the screw 3 to provide an equal distribution of forces, which would be offset by removing any portion of the retainer 10. Further, it is not even clear how (or why) the retainer ring 10 of Jelinek would be made so that it extends circumferentially less than all of the way around the screw 3, nor do the grounds of the rejection provide any explanation of the alleged modification.

Yabe is applied for allegedly teaching a “lubricant.” Without conceding to the Examiner’s position regarding Yabe, it is respectfully submitted that rejection’s reliance on the thrust bearing pin 118 of Cartwright and the retainer 10 of Jelinek, along with the alleged lubricant of Yabe is clearly not sufficient to support the rejection under 35 U.S.C. § 103, requiring it to be withdrawn.

**B. ONE WOULD NOT HAVE BEEN MOTIVATED TO MODIFY JELINEK,
IN VIEW OF YABE, CARTWRIGHT AND SPONTELLI TO OBTAIN THE FEATURES
OF CLAIMS 19 AND 25**

Claims 19 and 25 are patentable over the combination of Jelinek, Yabe, Cartwright, and Spontelli. The Examiner acknowledges that Jelinek fails to disclose a lubricant supply device having a cut part in the circumferential direction. The Examiner therefore contends that Spontelli would have taught this feature by its disclosure of a wiper assembly 17 having a cut part. Appellant submits that claims 19 and 25 are patentable at least by virtue of their dependency on independent claim 17. This is because the additional application of Spontelli would not have provided any motivation to modify Jelinek, Yabe and Cartwright, so as to provide the claimed features.

Furthermore, Appellants respectfully submit that the rejection is based on a strained interpretation of the references. This is because there is no teaching or suggestion found in the references that would have motivated one to modify Jelinek, Yabe and Cartwright in view of Spontelli. This lack of motivation is evident upon reading the references and understanding their

teachings. In particular, as shown in Fig 5 of Spontelli, the Examiner appears to rely on the illustrated device that is cut in half to form semi-circular cleaning sections. (See Spontelli, col. 2, lines 43-45.)

If one skilled in the art were presented with Spontelli, that person would not have been motivated to cut the ring 9 of Jelinek in any manner, let alone cut the ring to an outermost circumferential surface, as claimed. The Examiner alleges that the motivation to do so would be to “provide a more engaging device so that the supply of lubricant and preventing of dust can be realized...” (see Final Office Action dated February 18, 2004, page 5, third paragraph). Appellants respectfully disagree and submit that there is no teaching that would have motivated one to modify Jelinek in this manner.

First, because Jelinek uses the retainer 10 to surround the shaft 3, a cut part would be blocked from extending past the area of the retainer 10. Moreover, Jelinek is directed to providing a seal for high hydraulic pressures (i.e., 2500 psi or more) and, as one skilled in the art would appreciate, such a seal requires sufficient physical strength to withstand such pressures. There is no apparent reason to gratuitously cut any portion of the ring 9 in Jelinek, especially in view of the inevitable weakening of the ring 9 that would hinder (if not prohibit) Jelinek’s ability to withstand the high hydraulic pressures.

Accordingly, Appellants submit that one would not have been motivated to combine Jelinek, Yabe, Cartwright and Spontelli to derive the claimed features, requiring the rejection of claims 19 and 25 under 35 U.S.C. § 103(a) to be withdrawn.

**C. ONE WOULD NOT HAVE BEEN MOTIVATED TO MODIFY NILSSON,
IN VIEW OF MASUTANI, SUGIHARA AND JELINEK TO OBTAIN THE FEATURES
OF CLAIMS 17, 18 AND 20-24**

The Examiner contends that Nilsson shows a screw shaft 10, a nut member 11 and a lubricant supply device 15 (see Figure 1 of Nilsson). Similar to above, the retaining ring of claim 17 and its features are at issue. The Examiner has not provided a reference numeral for a “retaining ring” in Nilsson, but instead refers to the “element that covers the seal.” (See page 6, line 3 of the Office Action dated February 18, 2004.) Accordingly, it appears that the Examiner is referring to the outer boundary of element 15, as shown in Figure 1. The Examiner acknowledges that Nilsson fails to disclose a retaining ring that is “fastened to an *outside circumferential end face* of the nut member,” as recited in claim 17. (See page 6, lines 16-17 of the Office Action dated February 18, 2004.) An example of this feature is shown in Figure 19 of the present specification by the retaining ring 108 that is fastened to the nut member via the screws 111. The alleged “retaining ring” of Nilsson is clearly not fastened to an outside circumferential end face of nut member 11. Thus, the Examiner alleges that one would have been motivated to modify the “retaining ring” of Nilsson so that it is on the outside of the nut member 11. (See page 7, last paragraph of Office Action dated February 18, 2004.)

First, Appellants respectfully submit that it is not clear how one would even modify Nilsson so as to utilize the retaining 10 of Jelinek, nor has the Examiner presented such an explanation. Thus, for this reason alone, Appellants submit that a *prima facie* case of

obviousness has not been made and the rejection should be withdrawn. Further, it would be physically impossible to utilize the retainer 10 of Jelinek in the device of Nilsson so as to engage element 15 of Nilsson. Element 15 is disclosed as being a cleaning member and is encased within the nut body 11 so as to be inaccessible from the outside. If one attempted to insert the retainer 10 of Jelinek into the device of Nilsson, the attempt would be futile because the retainer 10 would be prohibited from contacting the cleaning element 15 due to the cleaning element 15 being encased in the number member 11. The application of Masutani and Sugihara also fail to provide any teaching to supplement the deficient teachings of Nilsson and Jelinek. Thus, the rejection of claims 17, 18 and 20-24 under 35 U.S.C. § 103(a) as being unpatentable over Nilsson in view of Masutani, Sugihara and Jelinek should be withdrawn.

Conclusion

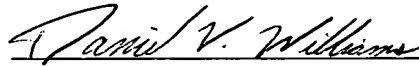
In view of the above, Appellants respectfully request the members of the Board to reverse the rejections of the appealed claims and to find each of the claims allowable as defining subject matter that is patentable over the art of record.

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37 and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

APPEAL BRIEF UNDER 37 C.F.R. § 41.37
U.S. Appln. No.: 09/809,262

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Respectfully submitted,



Daniel V. Williams
Registration No. 45,221

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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CUSTOMER NUMBER

Date: October 18, 2004

CLAIMS APPENDIX

CLAIMS 17-23 and 25-27 ON APPEAL:

1.-16. (canceled).

17. A feed screw device comprising:

a screw shaft;

a nut member threadably engaging an outer periphery of the screw shaft; .

a lubricant supply device having an insertion hole formed in an outer periphery side thereof, said lubricant supply device coming in contact with the outer peripheral surface of said screw shaft, such that a portion of said lubricant supply device which contacts the outer peripheral surface of the screw shaft comprises a material including a lubricant;

a retaining ring for retaining said lubricant supply device, said retaining ring extends radially beyond the lubricant supply device; and

a projection formed on said retaining ring and disposed so as to be received in the insertion hole, such that said projection extends circumferentially less than all of the way around said screw shaft, wherein the retaining ring is fastened to an outside circumferential end face of the nut member.

18. The feed screw device according to claim 17, in which said nut member is provided with a recess portion, wherein said retaining ring retains said lubricant supply device within said recess portion.

19. The feed screw device according to claim 17, in which said lubricant supply device has a cut part at a place in the circumferential direction.

20. The feed screw device according to claim 17, in which said lubricant supply device comprises a plurality of lip parts projecting toward said screw shaft and which come in sliding contact with the outer peripheral surface of said screw shaft.

21. The feed screw device according to claim 17, wherein said retaining ring is fixedly secured to said nut member, and said projection formed on said retaining ring prevents said lubricant supply device from rotating with said screw shaft.

22. The feed screw device according to claim 17, wherein a spiral projection is formed on an inner peripheral surface of said lubricant supply device, said spiral projection fitting into a thread groove of the screw shaft.

23. The feed screw device according to claim 17, in which the portion of said lubricant supply device which contacts the outer peripheral surface of the screw shaft comprises a rubber material including the lubricant or a synthetic resin material including the lubricant.

24. (canceled).

25. The feed screw device according to claim 19, wherein said cut part extends radially from an innermost circumferential surface of said lubricant supply device to an outermost circumferential surface of said lubricant supply device.

APPEAL BRIEF UNDER 37 C.F.R. § 41.37
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26. The feed screw device according to claim 17, wherein the retaining ring is disk-shaped.

27. The feed screw device according to claim 17, wherein the projection is a tab formed from an outwardly bent portion of the retaining ring.